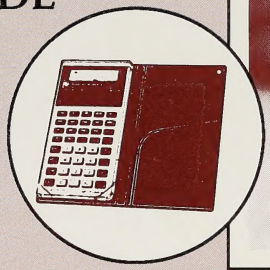
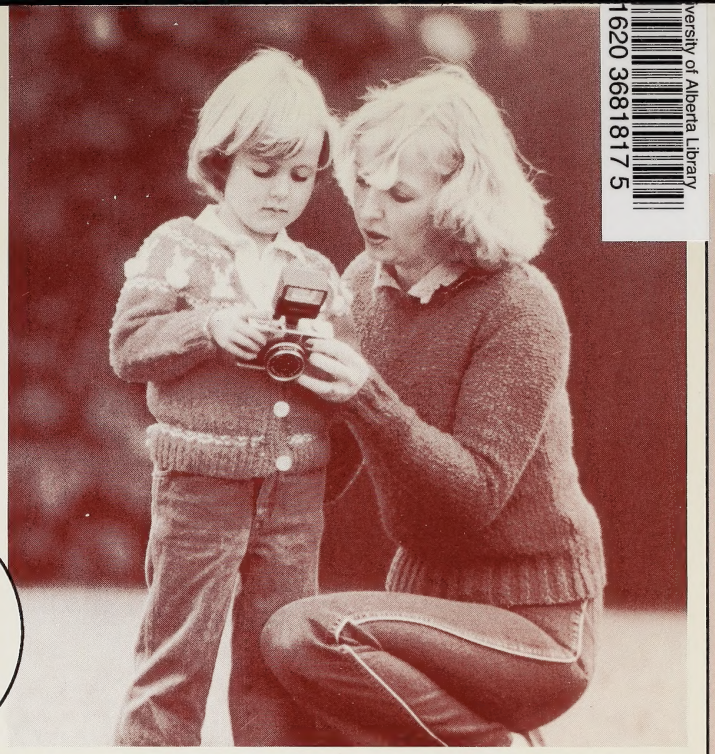
COURSE INTRODUCTION
and
PROBLEM SOLVING

MODULE 1

STUDENT SUPPORT GUIDE





MATHEMATICS 7

Distance Learning

Alberta
EDUCATION

Mathematics 7

Course Introduction and Module 1

STUDENT SUPPORT GUIDE

Note to the Parent or Guardian

This Student Support Guide contains answers to the activities in the accompanying Module Booklet. It should be kept secure by the parent or guardian if the student is under 16 years of age. Younger students should not have access to this Guide except under supervision.

This Student Support Guide does not contain the answers to the accompanying Assignment Booklet. The Assignment Booklet will be graded by the student's distance education teacher.

Mathematics 7
Student Support Guide
Module 1
Problem Solving
Alberta Distance Learning Centre
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CONTENTS

Acknowledgements

Project Manager

Linda Cox, Alberta Distance Learning Centre (formerly Alberta Correspondence School)

Curriculum Validator

Merv Lastiwka, Edmonton Public Schools District No. 7

Contributors

Lynda Antoniuk, Edmonton Public Schools District No. 7
Sharon Kratky, Edmonton Public Schools District No. 7
Susan Ludwig, Edmonton Roman Catholic Separate School District No. 7
Carolyn Martin, Edmonton Roman Catholic Separate School District No. 7
Bill Peterson, Alberta Distance Learning Centre
Richard Robinson, Alberta Distance Learning Centre
Bryan Sosnowski, Edmonton Public Schools District No. 7
Jim Williams, Edmonton Public Schools District No. 7
Rod Buga, Edmonton Roman Catholic Separate School District No. 7
Ralph Lee, Edmonton Public Schools District No. 7
Wendy Lukawesky, Edmonton Public Schools District No. 7
Dennis McCarthy, Alberta Distance Learning Centre
Lucy Piard, Alberta Distance Learning Centre
Joe Symak, Alberta Distance Learning Centre
Peter Tymkow, Alberta Distance Learning Centre
Marie Hauk, University of Alberta

COURSE INTRODUCTION

Forward

Welcome to distance learning. You have chosen an alternate form of learning that allows your student greater freedom in some ways than traditional classroom learning. It also requires discipline and motivation for your student to carry on without someone standing behind and pushing as a classroom teacher often does. For junior high students distance learning is generally more effective if there is a learning facilitator. A parent or guardian of a student studying at home can be this person. As the learning facilitator you will have to help motivate and discipline your distance learning student.

This guide has been developed to assist you. It begins by familiarizing you with the process of learning at a distance. You will learn what is expected of a learning facilitator, how the course is set up, and how to help your student complete the course successfully. This guide contains guidance and answers to the activities your student is expected to do. Begin by reading the introductory material in this guide.

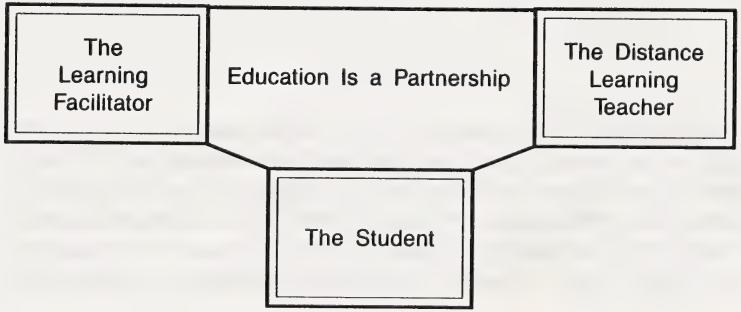
Distance Learning

The Role of the Learning Facilitator

As the learning facilitator you have a key role in determining the success your student has taking this course. Students need encouragement and the confidence of knowing that the course is important to their future.

You are expected to perform the following duties:

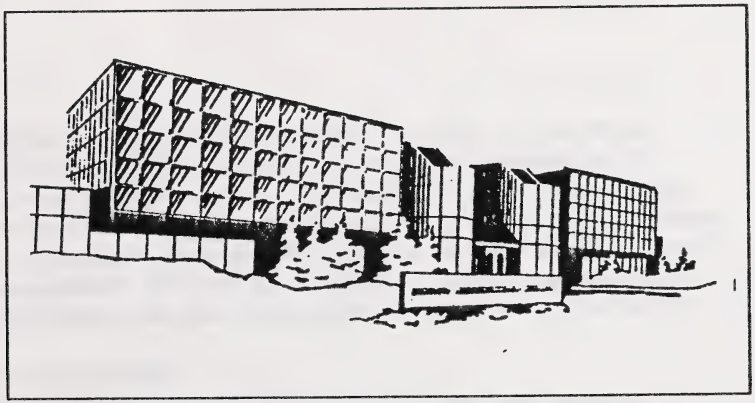
- be the contact person with Alberta Distance Learning Centre (formerly Alberta Correspondence School)
- ensure the student has a suitable study area
- ensure the safe handling of media
- supervise the student's completion of modules
- monitor the student's progress
- provide the student with encouragement
- check the student's work, or supervise the student's checking of the activities
- supervise the submission of assignments



The Alberta Distance Learning Centre

The Alberta Distance Learning Centre (formerly Alberta Correspondence School) helps those who want to learn at a distance.

The Alberta Distance Learning Centre



The Alberta Distance Learning Centre is a branch of Alberta Education. It helps educate approximately 40 000 students a year from all parts of Alberta, the rest of Canada, and all over the world. Not all these students study on their own. Some students use distance learning courses to work at their own pace but work in schools or institutions under the guidance of a learning facilitator. The Alberta Distance Learning Centre provides materials for grades one to nine, for the core subjects in high school, and for many option courses. All courses follow Alberta curriculum guidelines.

The building, located in Barrhead, Alberta is about 6 500 m^2. Barrhead is located 120 km northwest of Edmonton. It contains a modern printing and typography unit, an instructional design unit, a teaching unit, a shipping and mailing unit with its own postal code, and a student services unit. The staff numbers about 200. Some teaching staff work in their homes on a contract basis.

How the Assignments Are Processed

1. Your student's assignments are received at the Mailing Department and sent to the Recording Department.

2. At the Recording Department materials are separated and labels are checked to see that they are correct. Assignments are sorted into Elementary, Junior High, and Senior High subject areas.

3. All assignments and tests are entered into the computer.

4. Depending on the teacher to whom the student is assigned, the student's assignments come to the in-house teachers at the Alberta Distance Learning Centre or go to the contract teachers who work at home.

5. Corrected assignments are returned to the Recording Department. The marks are entered into the computer.

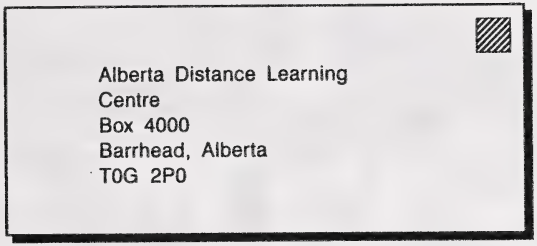
6. The assignments are put into envelopes and mailed back to the students.

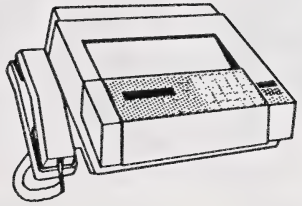
It is important to label your materials carefully so that they are not lost in the masses of paper that are sent to the centre.

How to Make Contact

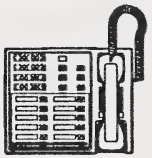
As the learning facilitator, one of your important roles is to be the contact person with the Alberta Distance Learning Centre. Staff members at the Alberta Distance Learning Centre may need to contact you from time to time. Also, it may be necessary for you to contact us. If you need help or information, you may contact the Alberta Distance Learning Centre in one of four ways.

1. You may write a letter to be mailed or faxed. The fax number is 674-6588.





2. You may call the Alberta Distance Learning Centre.



- If you live in the Barrhead area, call 674-5333.
- If you live in other parts of Alberta, you may phone using the Government RITE System. Dial the number of the RITE Operator under you local Government of Alberta listings and ask for the Alberta Distance Learning Centre (formerly Alberta Correspondence School) (674-5333).
- If you live in an area of Alberta not serviced by the RITE System, simply dial "0" and ask for "ZENITH 22333"; then ask for the Alberta Distance Learning Centre (formerly Alberta Correspondence School).

3. Come to visit the Alberta Distance Learning Centre in Barrhead (120 km northwest of Edmonton). Office hours are 8:15 am to 4:30 pm, Monday to Friday, except on statutory holidays. Phone ahead if you wish to see a particular person.

4. Contact the Edmonton Study Centre. If you live in the Edmonton area, you may contact the Edmonton Study Centre for information, some supplies, and as a drop-off point for assignments. The hours are 8:15 am to 4:30 pm, Monday to Friday. Telephone 427-2766.

Edmonton Study Centre
9th Floor
Harley Court
10045-111 Street
Edmonton, Alberta

When you are concerned about course content, ask for a specific teacher or a particular department. When you are concerned about registrations, testing or accounts, ask for Student Services.

Student

Student

Teacher

Student Services

Registrations

All About Mathematics 7

Rationale and Philosophy

This learning package was designed and developed using these assumptions.

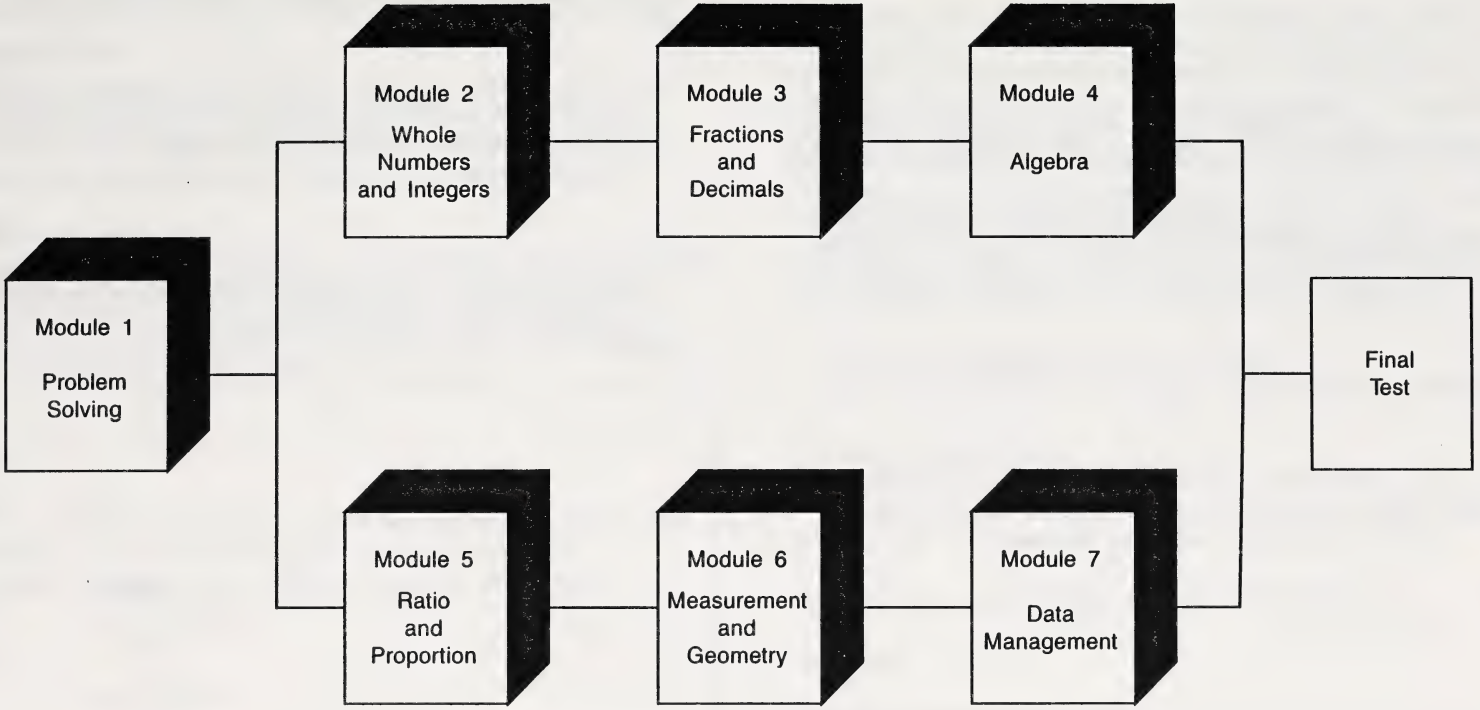
- It is important to enhance a student's ability to solve problems.
- In learning new concepts students need to progress in stages from concrete, through pictorial, to symbolic.
- Students have varying learning styles and abilities which must be recognized.
- Calculators and computers are tools with which students must become familiar in order to function effectively in this technological age.
- Students need opportunities to practice new skills and to maintain previously-developed skills.
- The progress students make in meeting mathematical objectives should be evaluated using both formal and informal methods.

Goals

The goals of this learning package are to enable students to do the following.

- to grow in the their capability to solve problems
- to use mathematics as a tool in the pursuit of personal goals and aspirations
- to develop good self-concepts and positive attitudes towards mathematics and lifelong learning

Course Structure



It is recommended that the student start with Module 1 because this module includes basic introductory information.

It is further recommended that students do the modules in order because each module requires skills introduced in previous modules.

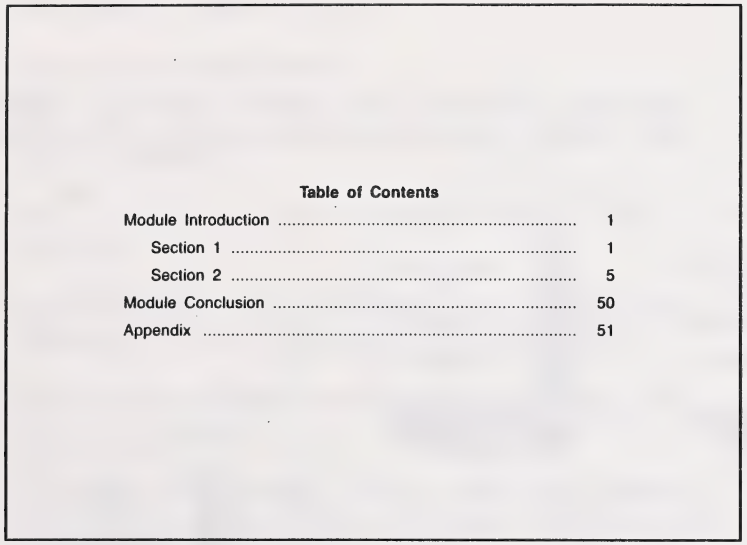


Table of Contents

The structure of the modules in Mathematics 7 follows a systematic design. Each begins with a table of contents. A Module Introduction gives an overview of the module and an evaluation statement.

The body of the module is made up of closely related sections. The number of sections will vary from module to module, but each section contains student activities that develop strategies, knowledge, and skills centred around a theme.

The Module Conclusion focuses on the main ideas that the student has learned. The appendix includes a glossary and may include pull-out sheets.

Design

Section Objectives

Each section begins with a box entitled "What Lies Ahead." This box focuses the student on what skills and terms the student is expected to learn.

Activities

Most sections have a wide variety of activities:

- **Listening** and **Reading Activities** guide the student through the development of various concepts. The reading passages use worked examples and are written at a suitable reading level.

- **Video Activities** give the student opportunities to see and hear mathematical concepts discussed.

- **Introductory Activities** and **Learning Aids Activities** prepare the student for the section. The Learning Aids Activities use learning aids or manipulatives so that the student has concrete experiences.

- **Practice Activities** give the student practice doing routine questions similar to those in the examples.

- **Extra Practice Activities** give the student who has experienced difficulty with the Practice Activities extra practice. Often a computer drill and instruction is included as an option.

- **Concluding Activities** give the student non-routine problems, computer games, and other enrichment activities.

Note

Students are **not** expected to do all the activities in the module booklet. You will help the student decide which activities are appropriate for his or her level of understanding and learning style preferences.

Skills

When new skills are introduced in the course, examples are provided. It is important that the student studies the examples carefully and practises using the new skill.

Terms

When new terms or concepts are introduced in the course, it is important that the student understands that the terms are new and he or she should read carefully to fully understand what they mean. The course has been designed so that new terms or concepts are given special attention. Most often, they are **defined** and **explained** within the sentence or paragraph. Also check the beginning of the Appendix in each module booklet. A special Glossary is included. As you supervise the student, make sure he or she knows what the new term and concepts are and what they mean.

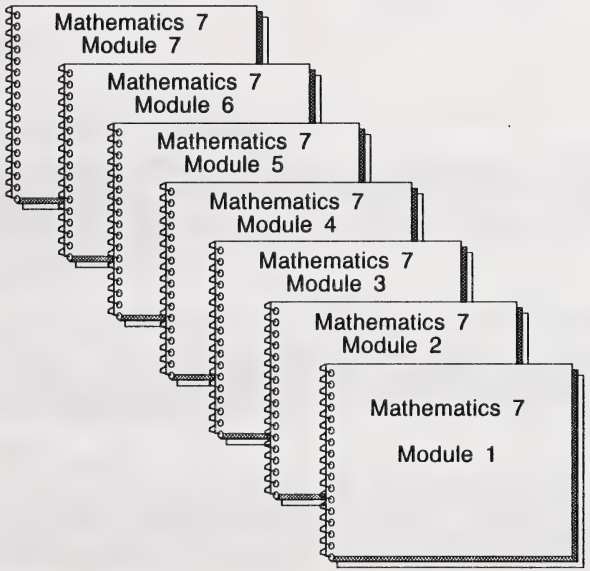
Course Materials

This new learning package involves many other components in addition to the Student Support Guide.

Module Booklets

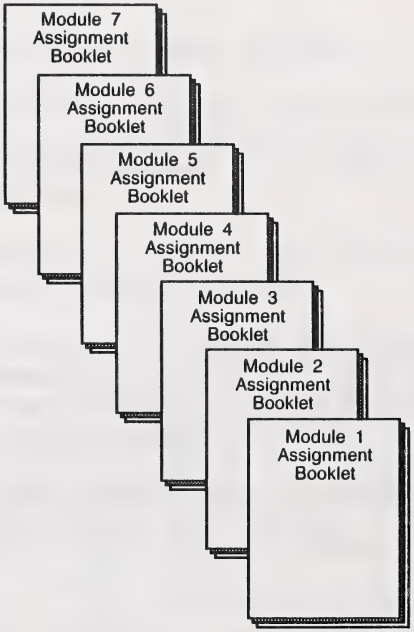
The print components involve seven booklets called Module Booklets.

The module booklets act as study guides and direct the student activities.

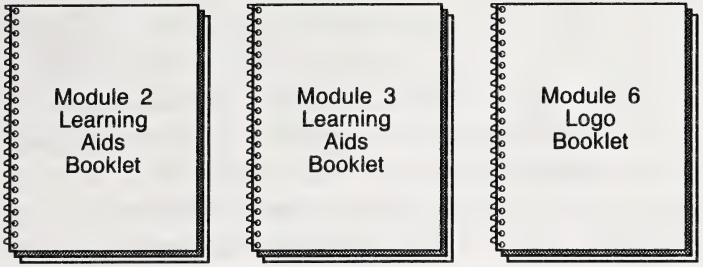


Assignment Booklets

Accompanying each module is an Assignment Booklet. The student's mark for each module will be determined by how the assignments are completed in the assignment booklet. If they are having difficulties, they should go back and review the appropriate section in the module booklet.



Special Booklets

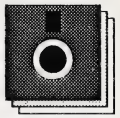


Accompanying Modules 2, 3, and 6 are special booklets. The Learning Aids Booklets guide the student through concrete experiences with whole numbers, fractions, and decimals. The Logo Booklet guides the student through a variety of computer activities.

The Learning Aids Booklets require manipulatives which are available on a loan basis.

The Logo Booklet requires Logo software and is optional.

Media



Computer Disk

Videocassette

Course Audiocassette Providing General Teacher Guidance

The learning package includes reference to media. Pathways have been developed so students can use a variety of media to learn what is important. These different routes have been included to guide different learners. Wherever videos have been included, a print pathway is also available. This way, if the media isn't available or desired, a student can follow the print pathway and still successfully complete the course.

A special audiocassette features a teacher guiding the student through the course. The appearance of the teacher icon reminds students that there is this additional help available.

A list of video and computer programs used in the course is listed on the following page.

If your student is on a home-schooling contract, you should contact your home-schooling coordinator or superintendent to discuss the availability of computer and video programs from the media resource centre in your school division.

Occasionally, The ACCESS Network airs some of the video programs on television. Contact The ACCESS Network for more information about scheduling.

Some of the computer programs may be purchased from the Learning Resources Distributing Centre or a local computer software supplier. Look for computer software in the Yellow Pages of your telephone directory.

Optional Video Programs

THINK ABOUT: Find Your Guide (AIT)
THINK ABOUT: There Are Many Ways to Go (AIT)
THINK ABOUT: Using Estimating and Approximating (AIT)
MATHWORKS: Identifying the Problem (AIT)
MATHWORKS: Simplifying a Problem (AIT)
MATHWORKS: Place Value of Large Numbers (AIT)
MATHWORKS: Using Mental Computation for Addition (AIT)
MATHWORKS: Using Mental Computation for Subtraction (AIT)
MATHWORKS: Relating Decimals and Fractions (AIT)
MATHWORKS: Analyzing Data (AIT)
SOLVE IT: Reasonableness of Answers (AIT)
SOLVE IT: Guess-Check-Revise (AIT)
SOLVE IT: Solving a Simpler Problem (AIT)
SOLVE IT: Using Mental Computation for Multiplication (AIT)
SOLVE IT: Estimation Strategies for Multiplication (AIT)
SOLVE IT: Estimation Strategies for Division (AIT)
SOLVE IT: Ordering Decimals (AIT)
SOLVE IT: Precision and Estimation (AIT)
SOLVE IT: Measuring Volume (AIT)
SOLVE IT: Measuring Angles (AIT)
MATHWISE: Locating and Interpreting Graphs (AIT)

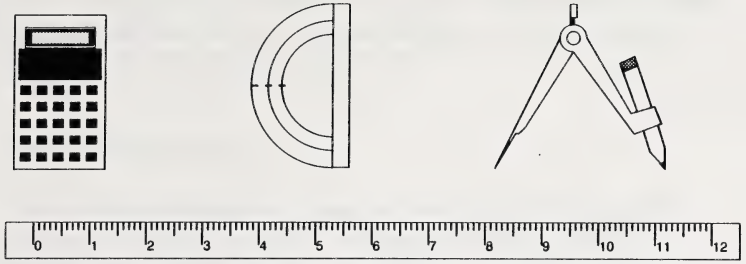
Computer Programs

Conquering Whole Numbers (MECC)
Growgins' Fractions (MECC)
Problem-Solving Strategies (MECC)
Number Munchers (MECC)
Mathematics Activities Courseware 6, 7, and 8 (Houghton Mifflin)
Computer Drill and Instruction: Mathematics, Level D (SRA)
Math Strategies: Problem Solving (SRA)
Fraction Factory (Springboard Software)
Apple Logo
Mathematics for Science: Measurement (Merlan Scientific)
Integer Fast Facts (Edusoft)
Geo Pool and Geo Billiards (CAE Software Inc.)

Handling the Software

Whether the software is loaned or purchased, it is important to take care of these items. Scratches, dirt, grease, extreme temperatures, or magnetic fields such as those in electric motors can damage them.

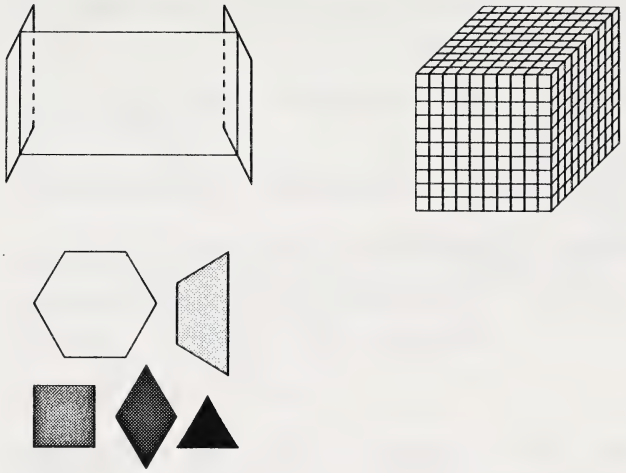
Mathematical Tools



The learning package refers to mathematics tools which are required for some activities. These must be purchased by the student.

In addition, it is recommended that students have access to metric measuring cups and spoons.

Learning Aids



The learning package also refers to learning aids or manipulatives such as base 10 blocks, plexiglass MIRA, and pattern blocks. These are available in a loan kit from the Alberta Distance Learning Centre. A caution fee must be paid.

These learning aids may also be purchased from the Learning Resources Distributing Centre.

Summary

Materials Supplied*	Materials Required	Optional Materials**
Courseware: Student Support Guides (7) Module Booklets (7) Assignment Booklets (7) Logo Booklet (1) Learning Aids Booklets (2)	calculator geometry set which includes a metric ruler, a protractor, and a compass	VCR Computer (Apple 2E or compatible) video programs cited computer programs cited

*Your course materials may not all arrive in one shipment. You may receive only a portion at one time. Check your materials thoroughly when they arrive to ensure you have what the student needs.

**See list on page 14 of this booklet.

Evaluation

There are two kinds of evaluation used in the course. These are informal and formal. As the learning facilitator you will take part in the informal evaluation.

Informal Evaluation

The course contains two types of activities. In the module booklets there are learning activities that include basic practice and questions that help guide the students to a better understanding. It is important that these activities are corrected as soon as possible so the students get immediate feedback to confirm and clarify their understanding before they go on. **Checking the activities and discussing the results is one of the most important duties of the learning facilitator.**

When the student has completed an activity, you should skim over it before checking it to be sure the student has spent enough time and effort on the activity.

When checking a student's work, first focus on the work the student has done correctly and then comment on his or her effort. Then, if necessary, spend time clearing up any misunderstandings.

Listed below are a few suggestions that have proved to be constructive ways of handling errors. First, stop to consider why there are errors. Ask yourself the following questions:

- Is the student repeatedly making the same mistakes or do the errors appear to be random?
- Do the errors appear to be the result of carelessness?

If the student is repeatedly making the same mistakes, you may need to read through that section and explain the main ideas in your words.

If the error is random and does not have a serious impact, it may be ignored.

If the error appears to be careless you may need to

- check to see if the student understands the directions.
- relate the activity where the errors occur to some meaningful aspect of the student's life.
- discuss the information with the student.
- have the student slow down.
- give the student a rest.

Always instruct the student to correct his or her errors. The module booklet becomes an important reference when doing the assignments, and it is essential that it is accurate.

Remember, it is very important that students not only learn from their corrections, but they must realize that making mistakes is a normal part of learning.

You may decide to let the student check some of the activities after you have ensured that the student has spent enough time and effort on the activity. Make sure that you see the activity with its corrections before letting the student go any further in the module booklet.

It is of little value to students if you do their work. How many items are incorrect is not the most important thing, but how the mistakes are handled. Sometimes it is easier when you are guiding the student to put in the answers, but it does not help the student learn the concept. Activities with examples have been included with the student modules to provide guidance for the students.

Formal Evaluation

Formal Evaluation is based on the assignments in the assignment booklet and the final test. These are marked by a distance learning teacher.

There is an assignment booklet for each module in the course. The assignments are based on the work the student has completed in the module. The student may refer to the module booklet while completing the assignments but should complete the module assignment independently and should not receive help. The module mark is determined by how well the student does on the module assignment.

After each module, submitted to the distance learning teacher is evaluated, a letter grading is assigned which follows the scale of percentage below.

A	80% - 100%	
B	65% - 79%	
C	50% - 64%	
D	40% - 49%	
F	0% - 39%	
I	Incomplete	} Follow distance learning teacher's directions and return entire module in order to receive a grading.
R	Repeat	

Final Test

There is a final supervised test for Mathematics 7. The final test is based on the entire course. In order to pass Mathematics 7, the student must score at least a D (40%) on the test and have a final mark of at least a C (50%).

Final Mark

The final mark is determined by how well the student does on all modules and the final test. The test will make up 40% of the final mark in Mathematics 7. The other 60% will be based on the module assignments.

Below is a breakdown of how this course will be evaluated.

Module 1: 5%
Module 2: 10%
Module 3: 10%
Module 4: 10%
Module 5: 10%
Module 6: 10%
Module 7: 5%
Final Test: 40%

If the student is dissatisfied with his or her mark, you may request an appeal paper. Such requests should be made within 30 days.

Report Cards

Report cards are mailed twice a year — in October and in February — to all non-school students under 16 years of age. The principal or superintendent is also sent a copy of the report card. This card shows the number of modules completed in the course, the average grading per module, and the final mark received for the completed course.

Starting Out Right

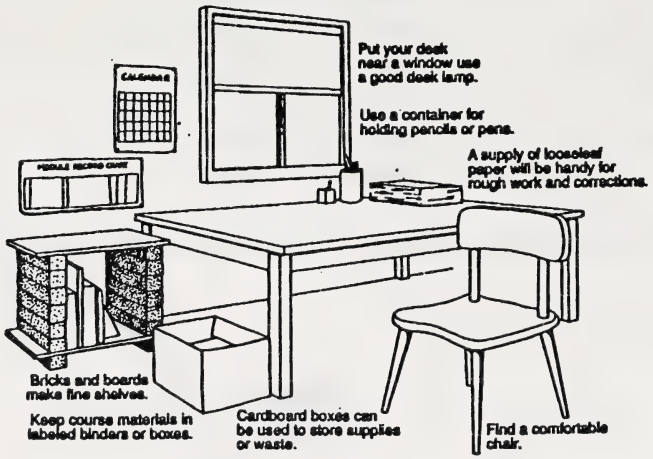
Proper planning, organization, and good study habits will help your student to succeed in his or her studies. This section of the guide will give you and your student some idea of how to use time efficiently so that the student can achieve his or her goals. If you are new to distance learning, both you and the student will probably benefit from the tips on time management and study habits in this section.

Setting Up Shop

Probably one of the best ways to ensure success in distance learning is to establish a study corner. This is a quiet, well-lit area where the student can leave books, papers, and supplies. It should be an area where there is no telephone, no radio, no television, and no people doing things that might cause distraction. Find the best place for studying in your home. A comfortable chair and sufficient work space, usually a table or desk, are essential. All necessary supplies, tools, materials, and books must be gathered. The work area could contain exercise equipment like barbells or even an exercise bike. When your student begins to feel sluggish, encourage a ten minute exercise break.

You may also wish to set up a media area. This can include a video player and/or a computer.

The following diagram may be helpful for organizing your study area.



Students should keep these course related articles in their work area.

pens	pencil crayons	return envelopes
pencils	extra paper	module materials
glue	geometry set	learning aids
tape	audiocassette player	ADLC phone number
eraser	calculator	timetable

An efficient student work place will help learning.

Time Management

There are so many demands on our time nowadays that we really must make the effort to organize our work and our activities. This organization or planning is called time management.

With distance learning, it is a necessity that the student plans his or her schedule. Your duty is to ensure that the student does some advance planning. Check the final plans to see if they are realistic.

Only you and the student know exactly how much time is available for completing a course. It does not matter too much what time of day the student does course work. This varies with the individual's situation. Distance education is flexible. To decide exactly how much time the student must make for his or her studies, the student must set priorities. Together you must decide exactly when you wish to have the course completed. You must take into account time worked away from home, time needed for chores, and time needed for recreation and relaxation when you make this estimate.

The following are average times to complete Mathematics 7.

Module 1: 2 weeks
Module 2: 9 weeks
Module 3: 6 weeks
Module 4: 5 weeks
Module 5: 5 weeks
Module 6: 7 weeks
Module 7: 4 weeks

You may wish to use these times as a guide.

Making a Weekly Plan

Discuss with your student the importance of weekly planning.

People who write for a living always have deadlines to meet. They cannot wait for inspiration. They discipline themselves to sit down and write for a number of hours every day. Whether they like it or not, they stick to a schedule. This determines success. Work with your student to

- keep track of what he or she usually does in a typical week.
- plan the studies he or she can do in a typical week.
- keep a list of what he or she must do each day and cross off each study task as it is completed.
- find his or her own best time to study.
- set deadlines and stick to them.
- not dwell on failures and get back on schedule.

Have the student fill in a weekly timetable.

Begin when he or she usually wakes up.

↓

Write in every hour.

↓

End when he or she usually goes to bed.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

The student should keep track of every major activity. It is not wise to plan to use 100% of his or her time. Allow for possible interruptions and jobs taking longer than planned.

Making a Monthly Plan

The next step is planning a monthly schedule with your student. The student should block off the days he or she knows are not available for studying.

- Count the days that are available between the start of the course and the desired finishing date.
- Allow time for review.
- Count the number of sections or modules that must be completed.
- Estimate how many days are available to complete each section and each module.
- Make a monthly plan like the one in the next column.

Sample Monthly Timetable

September

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
Total Work Days Available for Study						
Goal:						

Making a Course Plan

When you both have an idea of how much time is available every day, week, and month, look at a plan for completing the course(s) that the student is studying.

Modify these plans as circumstances change. Be flexible, but do not procrastinate.

Our experience has shown that a planned approach to module completion is far better than the "hit and miss" method of completing modules now and then, as you feel like it.

The student needs determination and perseverance to continue working independently. The student also needs your positive support and interest to keep motivated.

Sample Course Timetable

Course Name _____ Date of Starting _____

Planned Completion Date _____ Actual Completion Date _____

Module	Planned Completion Date	Actual Completion Date	Date Mailed	Date Returned
1				
2				
3				
4				
5				
6				
7				
Test				

Procedures

Supervising the Completion of Modules

Try to ensure that the student is following the timetable established as closely as possible and that the target dates for module completions are being met. If, for some reason, students miss time from studying, they should spend additional time during the evenings or weekends so they will complete their courses within the desired time limits.

When the student has completed the learning activities, you should allow the student to do the assignment in the assignment booklet. Afterwards you should go over the assignment to ensure the student has spent enough time on the assignment. When the entire assignment booklet is done satisfactorily, it should be promptly mailed for corrections to the Alberta Distance Learning Centre. While you are waiting for feedback from the teacher, you are encouraged to have the student start the next module.

How to Send in Assignments

Assignment booklets, along with any other requested materials, should be submitted to the Alberta Distance Learning Centre as soon as possible after the completion of each module in order to obtain speedy, regular evaluation and feedback. The student can proceed with the next module while waiting for the return of the assignment booklet.

Please ensure that your student's file number is on all assignments, tapes, and disks sent to the Alberta Distance Learning Centre.

Report any change of address immediately. If a change is not reported, it is impossible for the school to forward information, letters, or test applications.

Mailing

The student is required to pay the postage on everything sent or returned to the Alberta Distance Learning Centre. To speed up handling, first class postage is recommended on all assignments submitted.

The student is expected to perform his or her work and to correspond with teachers and administrative staff in an appropriate manner. The Alberta Distance Learning Centre reserves the right to cancel, without refund, the course of any student whose conduct is unbecoming.

Do not enclose letters concerning fees, guidance, additional courses, final tests, or general inquiries with assignments. Send these by separate mail to speed their handling and to avoid their misplacement.

Dropping Off Assignment Booklets

You may drop off assignments at the Edmonton Study Centre or in Barrhead at the Alberta Distance Learning Centre.

Faxing Assignments

Be sure the cover of your assignment booklet is filled in correctly with the proper label attached.

Check to see that all response pages have been completed as directed.

Check to see that all faxing boxes located at the bottom of each response page have been clearly filled out.

Costs for faxing assignments to the Alberta Distance Learning Centre are the responsibility of the student.

Monitoring the Student's Progress

Review returned assignments carefully with the student, noting the marks, teacher's corrections, and comments. The teacher may suggest that you make certain choices of activities in future modules to help you practise needed skills. Your teacher may also ask you to complete skill activities which are either included in the course or sent to you by the teacher. Returned assignments should be kept for future review and study.

An interim report card will be mailed at the beginning of February, and a year-end report card will be mailed at the end of September.

Students are encouraged to complete their program of studies by the end of June of the year in which they register, however, students may continue over the summer if they desire. If students are not finished with their courses by the year end, which is August 31, the registration may be extended for another year, but the superintendent should be made aware of this when a student lives in a school division, county, or district.

Students should be able to complete the full program in 10 months if effective instruction is taking place and there are no special circumstances which may influence the student's progress.

What to Do About the Final Test

When the student has nearly finished the course, you will have to help the student select an appropriate test supervisor and indicate your selection on the Supervisor Application Form. This form is mailed to the students when they complete Module 3. Guidelines for the selection of the supervisor accompany the application form.

After the supervisor, for the final test, has been selected, you should help the student arrange a time with the supervisor for the administration of the test. The test will be sent to the supervisor when all modules have been completed.

Providing the Student with Encouragement

The biggest problem faced by the students who select to study by distance education is that they may lose their motivation and discontinue their studies, or they take excessive time to complete their courses in an appropriate time period. A period of ten months is recommended although individual circumstances may require more flexibility.

Basic Study Tips

Planning and good study habits will help the student to succeed in distance learning. Here is a short list of important tips to discuss with the student.

1. Work together to make a course plan and weekly timetable, and follow them as closely as you can.
2. Remember that mornings are usually better for concentration. Learning styles may vary from student to student.
3. Check to see that all necessary materials and supplies are close by before starting work.
4. Have the student take relaxation or exercise breaks between study periods.
5. Be sure that the student completes all activities carefully and reviews corrections before moving to other assignments.
6. Ensure that the student understands and follows directions carefully when completing activities. If the student is unclear about what to do, the student should then restart by rereading the directions. If there are still problems, the student should discuss the activity with the learning facilitator. Sometimes reviewing the previous activities is helpful.
7. Ensure that the student always supplies his or her own written responses.
8. Encourage the student to switch from a subject or activity before it becomes stale. If the student is working regularly and truly concentrating, one or two hours on one subject should be enough at one sitting.
9. Have the student be sure that writing is neat, legible, and complete.
10. Encourage students to discuss their reading and writing with you.

Study Skills Videos

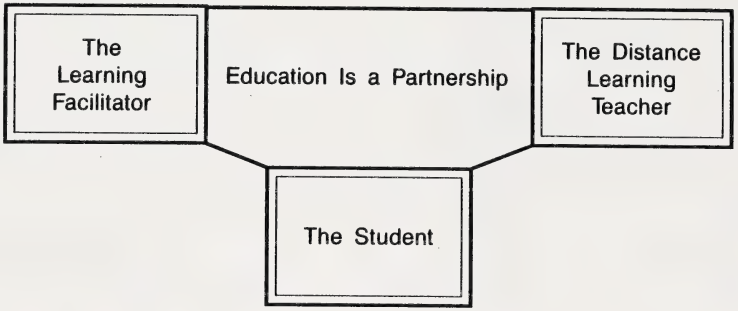
Here is a list of videos that may be helpful in developing good study skills.

THINKABOUT: You Can Remember (AIT)
THINKABOUT: Practice for Success (AIT)
THINKABOUT: Calm Your Jitters (AIT)
THINKABOUT: Get Ahead with Goals (AIT)
THINKABOUT: Make a Deal with Yourself (AIT)
THINKABOUT: There Are Ways to Remember (AIT)

If your student is on a home-schooling contract, you should contact your home-schooling coordinator or Superintendent to discuss the availability of these video programs from the media resource centre in your school division.

Summary

This introductory section of the Student Support Guide has been developed to assist you in your role as learning facilitator. Develop a routine with your student and a good working relationship. Remember that education is a partnership.



MODULE 1

PROBLEM SOLVING

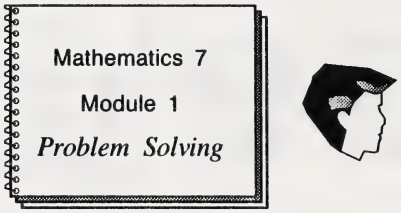
MODULE INTRODUCTION

What Lies Ahead

In the Module Introduction the student will learn what a "problem" is and that one of the main goals of this mathematics course is to improve the student's problem-solving skills.

Gathering Materials

For the Module Introduction the student will need the following item.



Put away the Assignment Booklet for Module 1 in a secure place until it is needed.

Tell the student where the video and computer disks are stored.

Guiding the Student

- Have the student read the Welcome and encourage the student to listen to the companion audiocassette.
- The teacher on the tape will help guide the student.
- Have the student preview the module booklet and read the Module Introduction.
- Next discuss the learning process, time management, and evaluation with the student. See the suggestions on the next page of this booklet.

The Learning Process

Each section of Module 1 deals with a different aspect of problem solving. Students will learn about this approach by reading notes in the module booklet or by viewing a video program. Afterwards the student will be given different problems to practice. Sometimes there is a computer alternative for students who have Apple or other compatible computers. When the student completes a practice exercise, you will help him or her check the answers and correct any errors. Emphasize to the student that the thinking process is more important than the answer. Encourage the student to explain how the answer was discovered.

Time Management

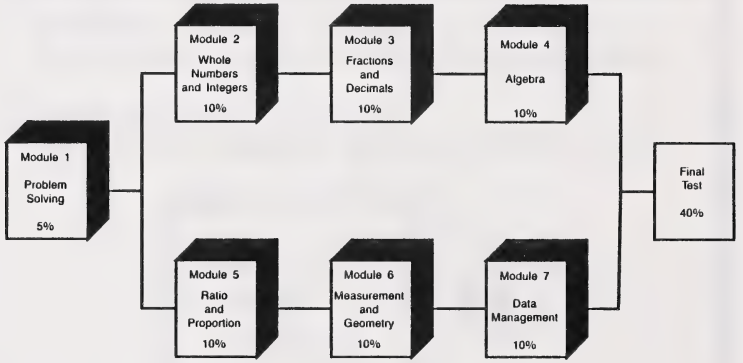
Decide how long the student will need to complete the module. An average student should spend about 2 weeks or 5 hours to complete the module. It is recommended that students spend no more than 1 hour at a time doing mathematics.

Evaluation

Explain that the grade on Module 1 is based on work in the Assignment Booklet. The module booklet will help prepare the student for the assignment booklet.

Module 1 is worth 5%.

Discuss the evaluation of the entire course.



THE FOUR-STAGE PROCESS

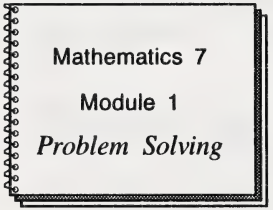
What Lies Ahead

In this section the student will learn the four stages of problem solving.

- understanding the problem
- developing a plan
- trying the plan
- looking back

Gathering Materials

The student will need these items for this section:



(optional)

THINKABOUT: Find Your Guide (AIT)

1 or 2 loonies ($1 coins)
1 metric ruler
4 cubes (sugar cubes, wooden cubes, or cardboard cubes)

Guiding the Student

- Have the student turn to Section 1 in the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. Name the four stages in the process of problem solving.

2. Tell how you would solve these problems.

   a. What is the worth of your height in loonies?

Suggested Answers

1. These are the four stages of problem solving.

   - understanding the problem
   - developing a plan
   - trying the plan
   - looking back

2. a. Measure your height in centimetres.

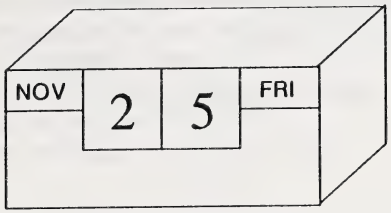
   Determine the number of loonies required to make a pile one centimetre thick.

   Multiply your height by the number of loonies required in the pile.

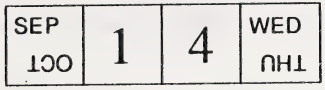
   Example

   If your height is 150 cm and the number of loonies required to measure one centimetre is 5, your height in loonies is $150 \times 5 = 750$ loonies.

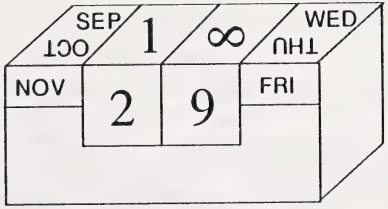
b. A calendar has four cubes that can be moved to show the date. The diagram below shows three views of the calendar: angle view (lid closed), top view (lid removed), angle view (lid removed). From the diagram you can only see parts of the four cubes. What numbers and words must there be on the six faces of each of the four cubes in the calendar in order to show all the dates in a year?



Angle View (Lid Closed)



Top View (Lid Removed)



Angle View (Lid Removed)

9 is a 6 when you turn the cube upside down.

b. For this problem the student may use four cubes. Use one cube to write the months of the year. Write two consecutive months on each side of the cube.

Use the second and third cube to write the dates of the month (01 to 31). To get the dates 11 ÷ 22 both cubes must have 1 and 2. To get the dates 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 20, 30 both cubes must have 0. Therefore, write 0, 1, 2, 3, 4, 5 on one cube. Write 0, 1, 2, 8, 7, and 6 or 9 on the other cube.

Use the fourth cube to write the days of the week. Write two consecutive days on each side of the cube. Two faces will be blank and one face will only have one day on it.

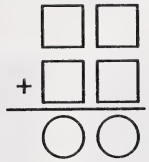
3. Jackie had this problem to solve.

   Margot saved $4 per week for 4 years. She did not keep her money in the bank. How much did she have at the end of the 4 years?

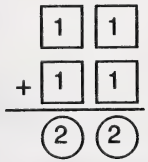
   Jackie decided Margot had $8320. Was her answer reasonable? Why or why not?

4. Frank had this problem to solve.

   Which digit goes in the □ and which digit goes in the ◯?



   Frank solved the problem this way.



   Are there any other possible answers to the problem? If so, what are they?

3. You can tell if the answer is reasonable by comparing the answer to an estimate.

   Example

   The amount saved in 1 year is about $50 × 4 = $200
   The amount saved in 4 years is about $200 × 4 = $800

   No, $8320 is not a reasonable answer.

4. Other Possible Answers

$$\begin{array}{r} 22 \\ +\ 22 \\ \hline 44 \end{array} \qquad \begin{array}{r} 33 \\ +\ 33 \\ \hline 66 \end{array} \qquad \begin{array}{r} 44 \\ +\ 44 \\ \hline 88 \end{array}$$

IDENTIFYING THE PROBLEM

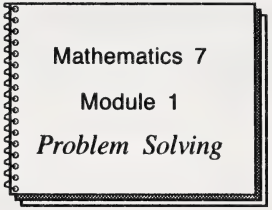
What Lies Ahead

In this section the student will learn these skills.

- identifying the essential elements of a problem namely what you know and what you need to know
- ignoring unnecessary details
- changing the setting of a problem to help understand the problem
- restating the problem in your own words

Gathering Materials

The student will need these items for this section:



(optional)

MATHWORKS: Identifying the Problem (AIT)

Guiding the Student

- Have the student turn to Section 2 in the Module Booklet and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. Cross out the unnecessary details in the following problems and restate the problems in your own words.

   a. Olive and Mike picked out a ~~digital~~ watch ~~with a timer and calendar for their father's birthday. His birthday is just 3 weeks away~~. Olive has $8.36 and Mike has $10.47. The watch, ~~which normally costs $35.00, is on sale. The sale price~~ is $25.00. Do Olive and Mike have enough money to buy the watch? If not, how much more do they need?

   b. Marilyn works ~~at Billy Bob's Burger Barn. She fries hamburgers and is in charge of the French fries. When she works~~ on Monday, ~~Wednesday, or Friday, she works~~ for 6 hours ~~a day. When she works~~ on ~~Tuesday or~~ Thursday, ~~she works~~ for 4 hours ~~a day. When she works~~ on Saturday, ~~she works~~ for 8 hours ~~a day. Last week she worked on Monday, Thursday, and Saturday~~. How many hours did she work?

Suggested Answers

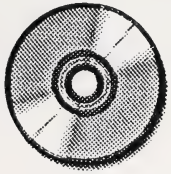
1. a. Olive and Mike want to buy a watch for $25.00. Olive has $8.36 and Mike has $10.47. How much more do they need?

   b. Marilyn worked 6 hours on Monday, 4 hours on Thursday, 8 hours on Saturday. How many hours did she work?

2. Change the setting in the following problems.

   a. A Portuguese man-of-war has tentacles 21.23 m long. A sea wasp has tentacles 8.75 m long. How much longer are the Portuguese man-of-war's tentacles?

   b. One compact disk for a personal computer can store 200 000 pages of information. A library has 300 reference books. If each book has about 400 pages, how many compact disks will be needed to store all the information in the reference books?



2. Answers will vary.

Examples

   a. A building is 21.23 m high. A second building is 8.75 m high. How much higher is the first building?

   b. A truck can carry 200 000 pencils. A factory has 300 boxes of pencils. If each box has about 400 pencils, how many trucks will be needed to carry all the pencils?

REASONABLENESS OF ANSWERS

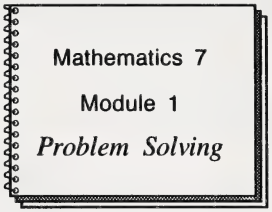
What Lies Ahead

In this section the student will learn these skills.

- estimating an answer
- determining if an answer is reasonable

Gathering Materials

The student will need these items for this section.



(optional)

SOLVE IT: Reasonableness of Answers (AIT)

Guiding the Student

- Have the student turn to Section 3 in the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

In Questions 1-3, estimate the answer. Then tell which answer is reasonable and explain why.

1. If a person walks 1 km, how many steps are taken? Hint: 1 km = 1 000 m

   a. 25
   b. 100
   c. 2000

2. A hamburger patty has a mass of about 100 g. How much ground beef is needed for 25 people, eating 2 hamburgers each? Hint: 1 kg = 1 000 g

   a. 5 kg
   b. 50 kg
   c. 500 kg

3. You brush your teeth 3 times a day. If you use 2 mL of toothpaste each time you brush, about how many weeks will it take you to use up a 100 mL tube of toothpaste?

   a. 2 weeks
   b. 6 weeks
   c. 12 weeks

Suggested Answers

1. If you assume the person will make 2 steps to walk a 1-m distance, then 2 000 steps will be required to cover 1 000 m which is equivalent to 1 km.

   c is the answer.

2. If 25 people could consume 50 patties, and each patty weighs 100 g, the total consumed will be 5 000 g which is equal to 5 kg.

   a is the answer.

3. I need 6 mL of toothpaste a day or 42 mL a week. So the 100 mL, I have, will last for about 2 weeks.

   a is the answer.

In Questions 4-6, calculate the answers. Then tell which answer is reasonable and why.

4. The 29 students in the seventh-grade class at the Willow Creek School are going on a field trip. Parents will drive them. Four students will fit in each car. How many cars will be needed?

   a. 7
   b. 1
   c. 7.25
   d. 8

5. Charlie's jazz band rehearsed a total of 29 hours in the last 4 days before the concert began. If they spaced their rehearsals equally over the 4 days, how many hours did they practise each day?

   a. 7
   b. 1
   c. 7.25
   d. 8

6. Annette has collected 29 cassette tapes. She wants to arrange them in a box which will hold 4 tapes in each row. How many tapes will she put in the last row?

   a. 7
   b. 1
   c. 7.25
   d. 8

4. **d** is the answer.

   $29 \div 4 = 7$ R1

   Using 7 cars will cause one student to be left behind. Since all of the 29 must go, 8 cars are needed.

5. The answer is **c**.

   $29 \div 4 = 7.25$

   An exact answer is needed here. Fractions of an hour are possible.

6. The answer is **b**.

   $29 \div 7 = 4$ R1

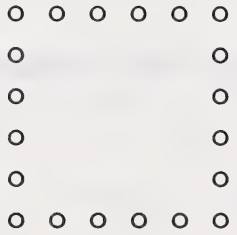
   Only 1 tape is in the last row since 28 tapes are required to complete 7 rows.

In Questions 7 and 8, draw a picture to help you get a reasonable answer.

7. Nadine is building a dog run. She wants the run to be a square with 6 upright posts on each side. How many posts will she need?

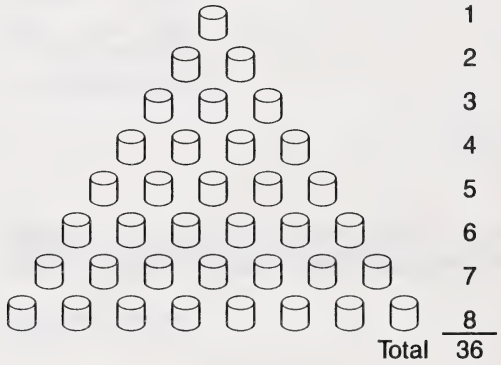
8. Kris is stacking cans for a display in the grocery store window. She wants to make the stack look like a pyramid. She plans to start with a row of cans at the bottom, and put one less can in each row as she goes up, ending with one can at the very top. If she has 36 cans to stack in the display, how many should Kris begin with on the bottom row?

7.



Number of posts needed = 6 + 4 + 6 + 4 = 20

8.



Kris should begin with 8 cans on the bottom row.

USING OBJECTS AND SKETCHES

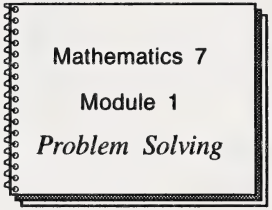
What Lies Ahead

In this section the student will learn these skills.

- using objects to solve problems
- drawing sketches to solve problems

Gathering Materials

The student will need these items for this section:



MATH STRATEGIES: Solving Problems (SRA) Disk 1
(optional)

5 jars
pennies
toothpicks

Guiding the Student

- Have the student turn to Section 4 in the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

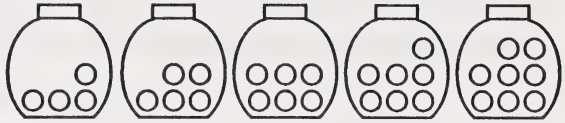
1. Use objects to help you solve the following problems.

   a. Five jars contain pennies. Each jar contains one penny more than the jar to its left. The last jar has twice as many pennies as the first. How many pennies are there in all?

   b. In the sketch 12 toothpicks are arranged to make 4 squares. (5 actually, but do not count the big square.) How can you make 3 squares by repositioning 3 toothpicks?

Suggested Answers

1. a.



Total number of pennies: 4 + 5 + 6 + 7 + 8 = 30

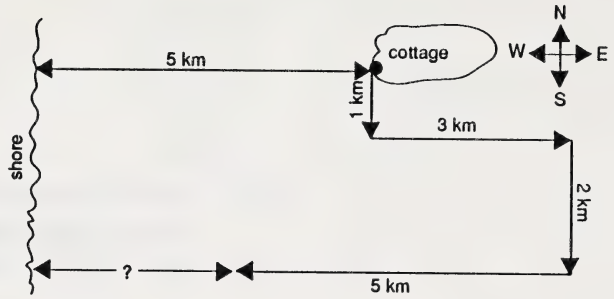
b.

2. Ken's cottage is on an island 5 km east of the shore of the lake. In his canoe he paddled 1 km south, 3 km east, 2 km south, and 5 km west. How far east is he from the shore of the lake?

a. Complete the sketch.

b. Solve the problem.

2. a.



b. Ken is 3 km east from the shore of the lake.

Computer Alternative

3. Museum Trip

   You'll need Disk 1 of *MATH STRATEGIES: Solving Problems* (SRA) to do this problem.

   From the Chapter Menu, choose "5 Using Models." Then choose "1 Museum Trip."

   After you've read the problem, decide how much help you want.

   Follow the directions on the screen.

   Note: Whenever a smiling face appears, the computer stops. To make it go on press RETURN.

3. Computer-checked

4. Measuring Puzzle

   You'll need Disk 1 of *MATH STRATEGIES: Solving Problems* (SRA) to do this problem.

   From the Chapter Menu, choose "5 Using Models." Then choose "Measuring Puzzle."

   Complete as many Measuring Puzzles as you wish at the computer.

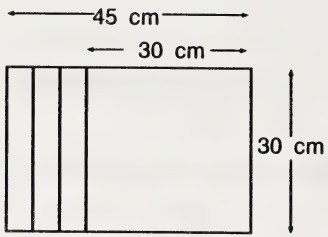
4. Computer-checked

Print Alternatives

5. A pan of brownies is 45 cm by 30 cm. When 3 equal rows are cut from one end of the pan, the remaining part is a square. How wide is each row?

6. A ball is dropped from a height of 24 m. Each time it hits the ground it bounces to half the previous height. The ball is caught when its maximum height is 3 m. What is the total distance travelled during the bounces before being caught?

5.



Calculate the total width cut.

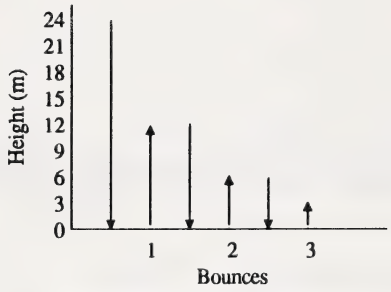
45 − 30 = 15

Calculate the width of each row.

15 ÷ 3 = 5

Each row is 5 cm wide.

6.



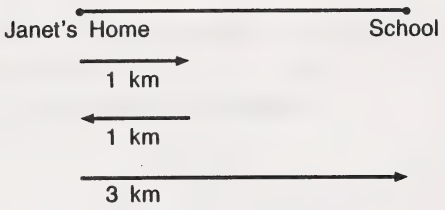
Calculate the total distance travelled.

24 + 12 + 12 + 6 + 6 + 3 = 63

The ball travelled a total distance of 63 m before being caught.

7. Janet lives 3 km from school. One morning she walked 1 km before realizing that she had forgotten a library book. She returned home for the book and then went to school. How far did she walk to get to school that morning?

7.



1 + 1 + 3 = 5

Janet walked 5 km to get to school on this particular day.

MAKING LISTS AND TABLES

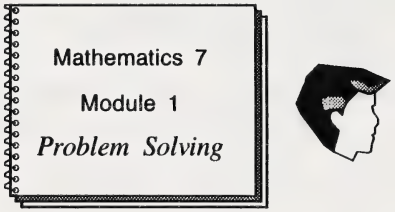
What Lies Ahead

In this section the student will learn these skills.

- making lists to solve problems
- making tables to solve problems

Gathering Materials

The student will need this item for this section.

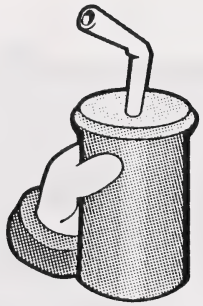


Guiding the Student

- Have the student turn to Section 5 of the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. A can of pop costs $0.80 in a vending machine. What coins can you use to buy one can? You can use quarters, nickels, and dimes. The machine does not give change.



2. At a track meet the children received 5 points for each first place ribbon and 3 points for each second place ribbon. Jason received 12 points. What ribbons did he win?

Suggested Answers

1. You can make a table to list the combinations.

Quarters	Dimes	Nickels
0	0	16
0	1	14
0	2	12
0	3	10
0	4	8
0	5	6
0	6	4
0	7	2
0	8	0
1	0	11
1	1	9
1	2	7
1	3	5
1	4	3
1	5	1
2	0	6
2	1	4
2	2	2
2	3	0
3	0	1

2. You can make a table to find the correct answers.

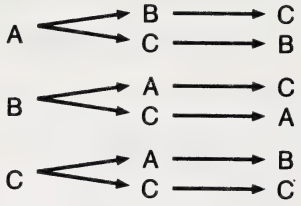
1st place ribbons	0	1	2	3
2nd place ribbons	4	3	1	0
Total points	12	14	13	15

Jason won 4 second place ribbons.

3. Adam, Basma, and Calvin are standing in line to buy tickets for a concert. In how many different ways can they stand in line to buy their tickets?

4. Nadine has 3 different pairs of pants, 4 different shirts, and 2 different sweaters. How many different sweater-shirt-pants combinations can she choose from?

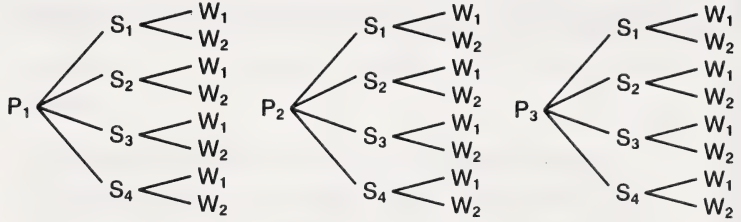
3. You can make a tree diagram. Let A represent Adam, B represent Basma, and C represent Calvin.



There are 6 different ways in which the ticket buyers can stand in line.

4. You can make a tree diagram.

Use P_1, P_2, P_3 to represent 3 different pairs of pants.
Use S_1, S_2, S_3, S_4 to represent 4 different pairs of shirts.
Use W_1, W_2 to represent 2 different sweaters.



There are 24 different sweater-shirt-pants combinations.

GUESSING-CHECKING-REVISING

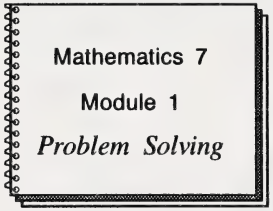
What Lies Ahead

In this section the student will learn these skills.

- solving problems by guessing, checking, and revising their answers
- organizing their guesses

Gathering Materials

The student will need these items for this section.



(optional) *SOLVE IT: Guess-Check-Revise* (AIT)

(optional) Disk A of MAC 7: *"Guess and Test"* (Hougton Mifflin)

Small squares of paper

Guiding the Student

- Have the student turn to Section 6 of the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

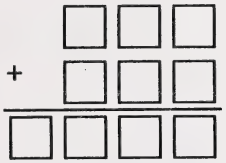
Practice Activities

Computer Alternative

1. Do the program "Guess and Test" on disk A of *MAC 7* (Houghton-Mifflin).

Print Alternative

2. Using each of the ten digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 only once, fill in the square to make this addition question true.



3. In the subtraction problem below, each digit was replaced by a letter. Determine the original problem. (Note: If a letter is repeated, it means that the same digit is repeated in those places.)

$$\begin{array}{r} A\,B\,A \\ -\quad C\,A \\ \hline A\,B \end{array}$$

Suggested Answers

1. Computer-checked

2. To make it easier to guess and check you can write the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 on small squares of paper. Notice it is easy to decide where to place the number 1.

$$\begin{array}{r} 789 \\ +\ 246 \\ \hline 1\,035 \end{array} \quad \text{or} \quad \begin{array}{r} 246 \\ +\ 789 \\ \hline 1\,035 \end{array}$$

3. $\begin{array}{r} 101 \\ -\ 91 \\ \hline 10 \end{array}$

4. A piece of fudge costs \$0.30, \$0.40, or \$0.60, depending on the type you buy. Yvonne bought the same number of \$0.40 fudge as \$0.60 fudge. If she paid \$6.90 for 15 pieces of fudge how many \$0.30 pieces of fudge did she buy?

4. A student may use as many guesses as required.

Example

Guess	Number of \$0.40 fudge	Number of \$0.60 fudge	Number of \$0.30 fudge	Test
1	2	2	11	2 × \$0.40 = \$0.80 2 × \$0.60 = \$1.20 11 × \$0.30 = \$3.30 Total \$5.30
2	**3**	**3**	**9**	**3 × \$0.40 = \$1.20** **3 × \$0.60 = \$1.80** **9 × \$0.30 = \$2.70** **Total \$5.70**
3	**4**	**4**	**7**	**4 × \$0.40 = \$1.60** **4 × \$0.60 = \$2.40** **7 × \$0.30 = \$2.10** **Total \$6.10**
4	**5**	**5**	**5**	**5 × \$0.40 = \$2.00** **5 × \$0.60 = \$3.00** **5 × \$0.30 = \$1.50** **Total \$6.50**
5	**6**	**6**	**3**	**6 × \$0.40 = \$2.40** **6 × \$0.60 = \$3.60** **3 × \$0.30 = \$0.90** **Total \$6.90**

5. Mai-Ling and Chris collect basketball cards. Mai-Ling has 23 more than Chris. Together they have 329. How many cards does Chris have?

5. A student may use as many guesses as required.

Guess	Chris	Mai-Ling	Test
1	200	200 + 23 223	200 for Chris + 223 for Mai-Ling 423 Total
2	175	175 + 23 198	175 for Chris + 198 for Mai-Ling 373 Total
3	150	150 + 23 173	150 for Chris + 173 for Mai-Ling 323 Total
4	153	153 + 23 176	153 for Chris + 176 for Mai-Ling 329 Total

FINDING AND APPLYING A PATTERN

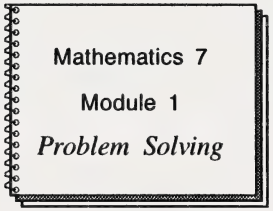
What Lies Ahead

In this section the student will learn these skills.

- making a simpler model of a complex problem in order to find a pattern
- applying the pattern to solve the problem

Gathering Materials

The student will need these items for this section.



(optional)

THINKABOUT: Find Your Guide (AIT)

SOLVE IT: Solving a Simpler Problem (AIT)

(optional)

MATH STRATEGIES: Problem Solving (SRA) Disk 1

Guiding the Student

- Have the student turn to Section 7 of the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Computer Alternative

1. Calculator Practice

   The computer program you will be using has a built-in calculator to help you do computations. So you should see how the calculator works.

   You will be working at the computer, so take this booklet and Disk 1 of the *MATH STRATEGIES: Problem Solving* (SRA) with you. Run the disk and wait until you see the Chapter Menu on the screen.

   Type "1." Press *RETURN*. Follow the directions on the screen until you see this chart:

KEY:	
Plus	+
Minus	−
Times	× or *
Divided by	/
Is equal to	*RETURN*

Suggested Answers

1. Computer-checked

Notice that you may type either [×] or [*] for multiplication. Also, since there is no [÷] key, use the [/] key for division [/] instead. (Note: You need to use the SHIFT key when typing [+] or [*].)

Type 46 + 38. Press *RETURN*. Here's what should be on the screen:

46 + 38 = 84

On the next line, you see a ":" followed by a flashing "_." This is the signal that the calculator is ready for the next calculation.

Try holding the SHIFT key and pressing the [=] key. As you can see, the "=" sign is not used on this calculator. Whenever you're ready for the calculator to show the answer, press RETURN instead.

Type 876. Then press the [←] key once. Watch carefully to see what happens. The 6 is erased. When you want to erase something you have typed, use the [←] key. Note: Once you have pressed RETURN, you cannot erase.

To erase all the work that is on the screen, type E. Try it.

If you want to type a 5-digit number, say 34 672, you will have to type 34672. The calculator will not accept spaces.

2. Spy Ring

   Choose "Program 5 Using Models" from disk 1 of the *MATH STRATEGIES: Solving Problems* (SRA) package. Then do the "Spy Ring Problem."

   Note

   When you see ":__" on the screen, it means you can use the built-in calculator to do calculations. After you have done the calculations you must enter your answer and press *RETURN*.

Print Alternative

For these problems, you may act out the problem or draw diagrams in order to help you find the patterns. Apply these patterns to solve the problems.

3. Eight students are having a chess tournament. They decided that everyone would play everyone else one game of chess, and the person who won the most games would be the winner. How many games of chess they will play?

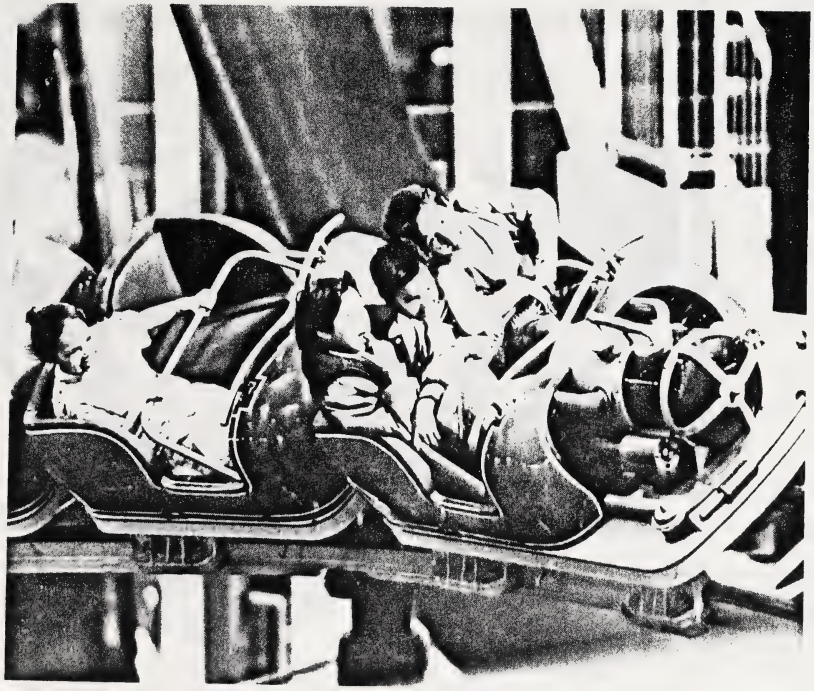
2. Computer-checked

3.

Student	Number of Games	Pattern	
1	0		
		+1	+1
2	1		
		+2	+1
3	3		
		+3	+1
4	8		
		+4	+1
5	10		
		+5	+1
6	15		
		+6	+1
7	21		
		+7	
8	28		

Eight students would play 28 games of chess.

4. Four adults and four children visited an amusement park and decided to ride on the roller-coaster ride. The rules required that each child be accompanied by an adult on the ride. How many different ways can the adults be paired with the children?



WESTFILE INC.

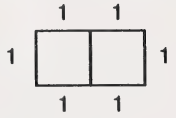
4.

Adults	Children	Different Pairs	Pattern
1	1	1	1 × 1
2	1	2	2 × 1
3	1	3	3 × 1
4	1	4	4 × 1
1	2	2	1 × 2
2	2	4	2 × 2
3	2	6	3 × 2
4	2	8	4 × 2
1	3	3	1 × 3
2	3	6	2 × 3
3	3	9	3 × 3
4	3	12	4 × 3
4	4	16	4 × 4

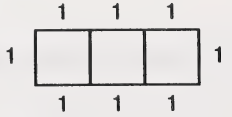
There are 16 different ways 4 adults and 4 children can be paired.

5. One person can be seated on each of the four sides of a square table. If the tables are arranged in one long row, how many square tables are needed to seat 40 people?

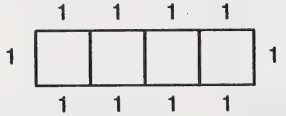
5. Two square tables will seat 6 people.



Three square tables will seat 8 people.



Four tables will seat 10 people.



Find the pattern.

Number of Tables	2	3	4
Number of People	6	8	10

+2 +2 ← Pattern

Apply the pattern.

Number of Tables	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Number of People	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40

+2 +2 +2

Nineteen square tables will seat 40 people.

SIMPLIFYING A PROBLEM

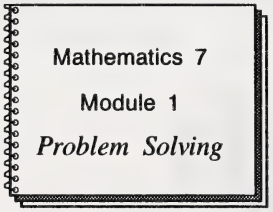
What Lies Ahead

In this section the student will learn these skills.

- using smaller numbers in a problem with big numbers
- breaking problems into steps

Gathering Materials

The student will need these items for this section.



(optional)

SOLVE IT: Solving a Simpler Problem (AIT)

MATH WORKS: Simplifying a Problem (AIT)

(optional)

MATH STRATEGIES: Problem Solving (SRA), Disk 1 and Disk 2

Guiding the Student

- Have the student turn to Section 8 of the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

In Questions 1 and 2 use a simpler problem to help you decide what to do. You can change the settings and the numbers, but do not change the operations.

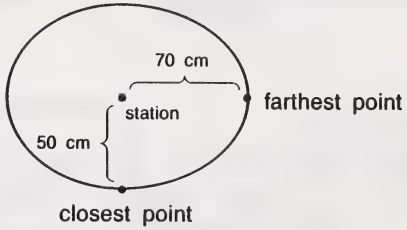
1. The planet Venus circles the sun in a highly elliptical or egg-shaped orbit, ranging between 109 000 000 km from the sun and about 107 000 000 km from the sun. About how much farther from the sun is Venus when it is at its farthest point, as compared to when it is at its closest point?

Suggested Answers

1. Models will vary.

Example

A toy train circles a railway station in an elliptical path. At its farthest point the train is 70 cm from the station. At its closest point the train is 50 cm from the station. How much farther from the station is the train when it is at its farthest point, compared to when it is at its closest point?



70 − 50 = 20

The train is 20 cm farther from the station.

From this simpler module you can see how to solve the original problem.

109 000 000 − 107 000 000 = 2 000 000

Venus is 2 000 000 km farther from the sun at the farthest point in its orbit as compared to its closest point in its orbit.

2. Distance in space is measured by light years. A light year is the distance that a beam of light travels in one year and is equivalent to 9 460 000 000 000 km. The Milky Way is estimated to be about 100 000 light years in diameter. What is the approximate diameter of the Milky Way in kilometres?

2. Models will vary.

Example

Distances can be measured by pacing. A pace is the distance you cover in one step and is about 0.5 m. My flower garden is about 6 paces in diameter. What is the diameter of my garden in metres?

$6 \times 0.5 = 3$

My flower garden is about 3 m in diameter.

From this simpler model, you can see how to solve the original problem.

$100\,000 \times 9\,460\,000\,000\,000 = 946\,000\,000\,000\,000\,000$

Computer Alternative

3. Do "Lightning Strikes" from *MATH STRATEGIES: Problem Solving* (SRA).

   You will need Disk 1. Start Disk 1. When the Chapter Menu comes on the screen, type "2" and press *RETURN*. You will then see the menu for Simplifying Problems.

   Type "1" for "Lightning Strikes" and press *RETURN*.

   Follow the instructions on the screen.

3. Computer-checked

4. Do "A Beautiful Dream" from *MATH STRATEGIES: Problem Solving* (SRA).

   Use Disk 2. From the Chapter Menu, choose "3 Problem Breakdown." Then, choose "2 A Beautiful Dream."

   Solve the problem at the computer.

4. Computer-checked

Print Alternative

In Questions 5 and 6 simplify the problems by doing them in steps.

5. Paul has muscular dystrophy and he uses a wheelchair. His county is having a walkathon for muscular dystrophy. Paul will "walk" with his wheelchair. If Paul goes 10 km, how much will he earn for muscular dystrophy? See the list of Paul's sponsors at the right. It shows how much each person will donate for each kilometre Paul covers.

5.

Sponsors	Amount per km
John Sanderson	$0.05
Gerry Van Buren	$0.25
Sophie Tuckerson	$1.00
Bill Erd	$0.60
Leslie Schwartz	$0.15
Sue Mullaby	$0.03

Method 1

Find the total amount per km.

$\$0.05 + \$0.25 + \$1.00 + \$0.60 + \$0.15 + \$0.03 = \$2.08$

Then multiply by 10.

$10 \times \$2.08 = \$20.80$

Paul earns $20.80 for muscular dystrophy.

Method 2:

You could also multiply each amount in the table by 10 and total them all.

$$\begin{aligned} 0.05 \times 10 &= \$\ 0.50 \\ 0.25 \times 10 &= \quad 2.50 \\ 1.00 \times 10 &= \quad 10.00 \\ 0.60 \times 10 &= \quad 6.00 \\ 0.15 \times 10 &= \quad 1.50 \\ 0.03 \times 10 &= \quad 0.30 \\ &\quad \$20.80 \end{aligned}$$

Paul earns $20.80 for muscular dystrophy.

6. A computer keyboard has a problem. It beeps whenever the 3 or the 8 key is typed. If you type the numbers from 100 to 199, how many times will the computer beep?

6.

Numbers	How many 3's	How many 8's
101 to 110	1	1
111 to 120	1	1
121 to 130	2	1
131 to 140	9	1
141 to 150	1	1
151 to 160	1	1
161 to 170	1	1
171 to 180	1	2
181 to 190	1	9
191 to 199	1	1
Total	19	19

The computer will beep 38 times.

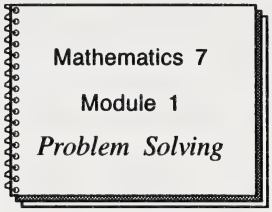
MORE THAN ONE WAY TO GO

What Lies Ahead

In this section the student will learn that there are many ways to solve one problem.

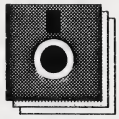
Gathering Materials

The student will need these items for this section.



(optional)

THINKABOUT: There are Many Ways to Go (AIT)



(optional)

Problem Solving Strategies (MECC)

Guiding the Student

- Have the student turn to Section 9 in the Module Booklet, and read the "What Lies Ahead" box and the introductory paragraphs of "Working Together."
- Next, have the student view the video or read the notes.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Computer Alternative

1. Do programs "diagonals" and "squares" in *Problem Solving Strategies.* (MECC).

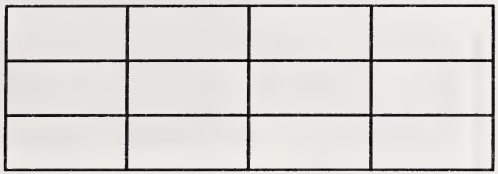
Suggested Answers

1. Computer-checked

Print Alternative

In Questions 2 and 3 use **two** different methods to solve the problems.

2. How many rectangles are in this figure?



2. One method is to make an organized list of the rectangles.

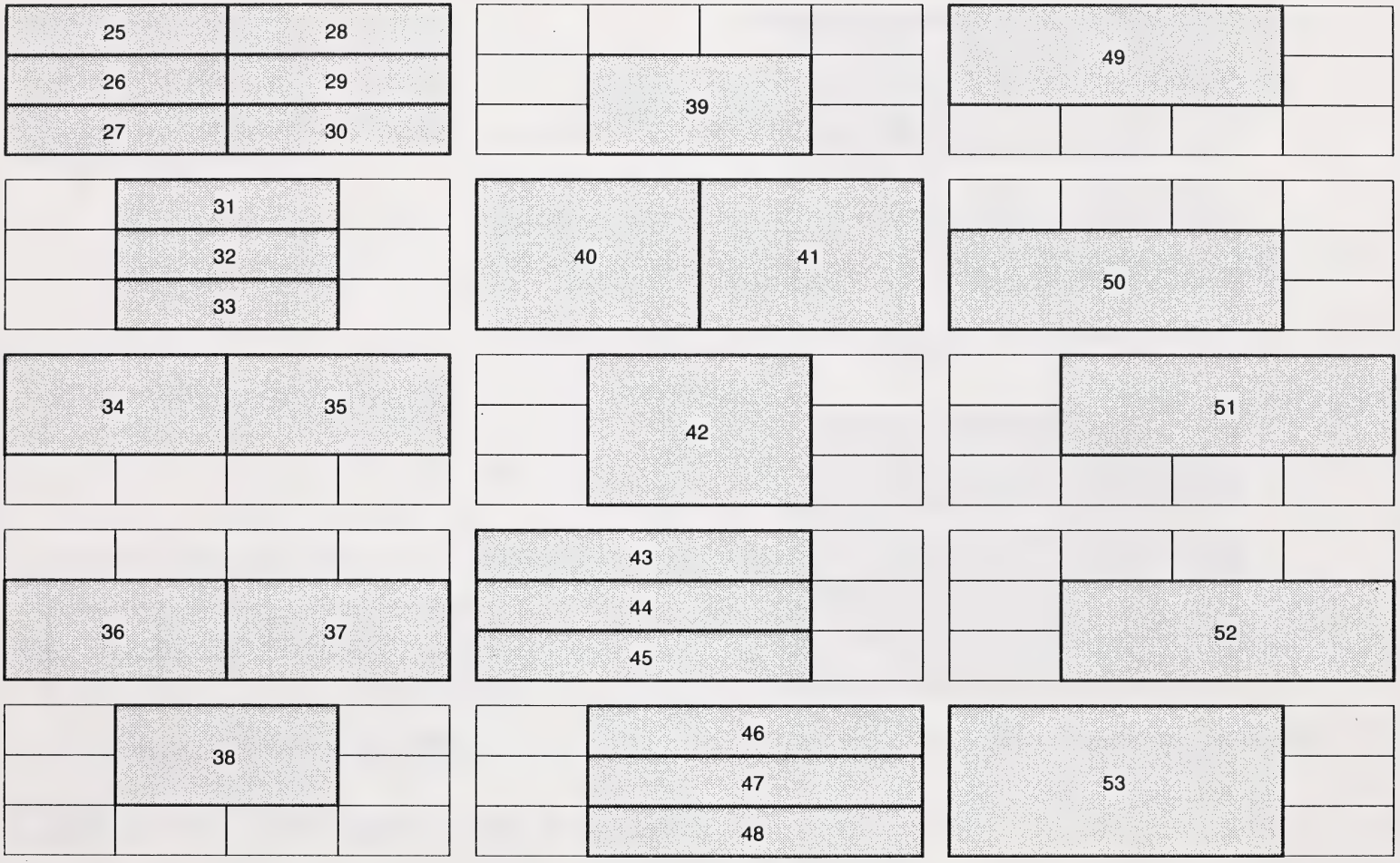
1	4	7	10
2	5	8	11
3	6	9	12

13	14	15	16

17	18	19	20

21	22	23	24

continued


25
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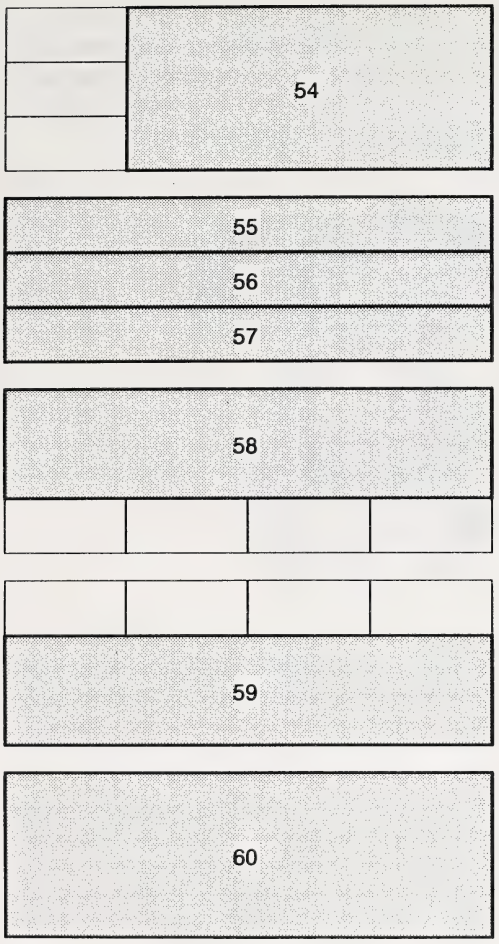
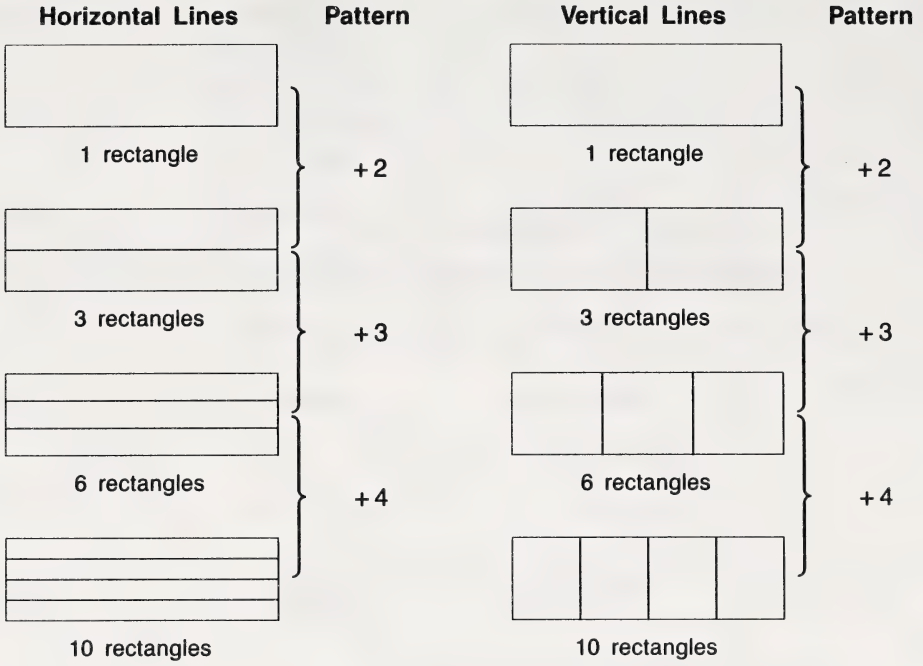
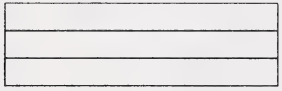
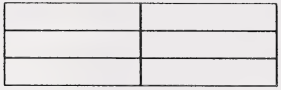
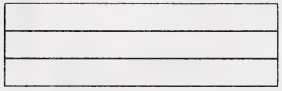
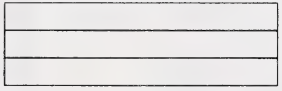
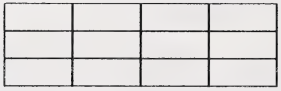


There are 60 rectangles altogether.

Another way to do 2.a. is to find a pattern. There is a pattern when lines are added to the original rectangle either horizontally or vertically.



Note there is a different pattern when lines are added in both directions.

Horizontal Lines	Vertical Lines	Lines in Both Directions	Pattern
 3 rectangles	 3 rectangles	 9 rectangles	$3 \times 3 = 9$
 6 rectangles	 3 rectangles	 18 rectangles	$6 \times 3 = 18$
 6 rectangles	 6 rectangles	 36 rectangles	$6 \times 6 = 36$
 6 rectangles	 10 rectangles	 60 rectangles	$6 \times 10 = 60$

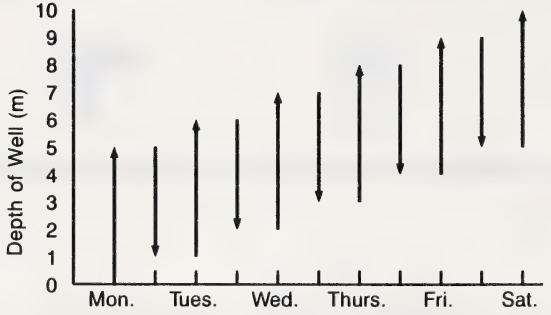
3. A well is 10 m deep. A salamander climbs up 5 m during the day and climbs down 4 m at night. If the salamander started at the bottom on Monday, on what day will it get to the top?

3. One way to solve this problem is to make a table.

	Day	Night
Monday	5 m	5 − 4 = 1 m
Tuesday	5 + 1 = 6 m	6 − 4 = 2 m
Wednesday	5 + 2 = 7 m	7 − 4 = 3 m
Thursday	5 + 3 = 8 m	8 − 4 = 4 m
Friday	5 + 4 = 9 m	9 − 4 = 5 m
Saturday	5 + 5 = 10 m reaches the top	

The salamander will reach the top on Saturday.

Another way to solve the problem is to make a diagram.



The salamander will get to the top on Saturday.

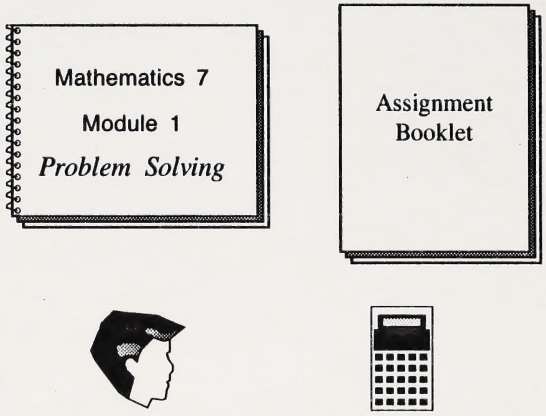
MODULE CONCLUSION

What Lies Ahead

The student is now ready to do the assignment in the Assignment Booklet. The student will be graded on the work done in this booklet.

Gathering Materials

The student will need the following items.



Guiding the Student

- Have the student complete the Assignment Booklet. The student may refer to the notes, but the assignments must be done independently.
- Afterwards, you should both sign the declaration and you should submit the Assignment Booklet to the Alberta Distance Learning Centre for feedback and a grade.

Mathematics 7

St. Support Guide
Module 1

L.R.D.C.
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